IN THE CLAIMS:

Please amend claims 1- 13 as follows:

1. (Currently Amended) ~~Iterative~~An iterative method for decoding a signal vector Y obtained from N sampled signals in a space-time communication system with M ~~transmit~~transmission antennae and N ~~receive~~receiving antennae, with N greater than or equal to M, with a view to obtaining an estimation of the symbols of the signals transmitted; characterized in that each iteration comprises the following steps:

- Pre-processing of the vector Y in order to maximize the signal to noise+interference ratio in order to obtain a signal $\tilde{r}^{\ell}$,

- Subtraction from the signal $\tilde{r}^{\ell}$ of a signal $\hat{z}^{\ell}$ by means of a subtractor, the signal $\hat{z}^{\ell}$ being obtained by reconstruction post-processing of the interference between symbols from the symbols estimated during the preceding iteration,

- Detection of the signal generated by the subtractor in order to obtain, for the iteration in progress, an estimation of the symbols of the signals transmitted;

and in that, the N signals being processed by time intervals T corresponding to the time length of the linear space-time code associated with the transmitted signals, the pre-processing step involves the matrix B in order to maximize the signal to noise+interference ratio, the transfer function of which is:

$$B^{\ell}=Diag\left(\frac{1}{\rho_{\ell-1}^2 A_i^{\ell}+\frac{N_0}{E_S}}\right)_{1\leq i\leq MT}.C^H V^{\ell}$$

with $V^{\ell}=\left[\frac{1-\rho_{\ell-1}^2}{\frac{N_0}{E_S}}C\cdot C^H+Id_N\right]^{-1}$; $A^{\ell}=diag\left(C^H\cdot V^{\ell}\cdot C\right)$;

wherein ℓ: iteration index; ρ: standardized correlation coefficient between the real symbols and the estimated symbols; N_0: noise variance; Es: mean energy of a symbol; C: extended channel matrix;

and in that the post-processing step involves a matrix D for the reconstruction of the interference between symbols, the transfer function of which is:

$$D^{\ell}=B^{\ell}.C\cdot\rho_{\ell-1}-Diag\left[\frac{1}{\rho_{\ell-1}^2 A_i^{\ell}+\frac{N_0}{E_S}}\right]_{1\leq i\leq MT}$$

2. (Currently Amended) ~~Method~~The method according to claim 1, ~~characterized in that~~wherein the pre-processing step is carried out by operating a matrix multiplication between the signal vector Y and a matrix B, the matrix B being updated at each iteration.

3. (Currently Amended) ~~Method~~The method according to claim 1 ~~or 2, characterized in that~~, wherein the post-processing step is carried out by operating a matrix

multiplication between the vector of the symbols estimated during the preceding iteration and the matrix D, the matrix D being updated at each iteration.

4. (Currently Amended) ~~Method~~The method according to claim 2~~or 3, characterized in that~~, wherein for each iteration, the standardized correlation coefficient ρ is calculated, the updating of a matrix being achieved by determining new coefficients of the matrix as a function of the correlation coefficient obtained for the preceding iteration.

5. (Currently Amended) ~~Method~~The method according to ~~any one of the preceding claims, characterized in that~~ claim 1, wherein in order to determine the correlation coefficient ρ^{ℓ} for each iteration:

- the signal to interference ratio SINR is calculated using the following formula: $SINR^{\ell} = \left[\frac{1}{\xi^{\ell} e^{\xi^{\ell}} E_1(\xi^{\ell})} - 1\right] \frac{1}{1-\rho_{\ell-1}^2}$

and defining the integral exponential $E_1(s) = \int_s^{+\infty} \frac{e^{-t}}{t} dt$

with $\xi^{\ell} = \frac{\varsigma}{1-\rho_{\ell-1}^2}$ and $\varsigma = \frac{N_0}{NE_s}$

- the symbol error probability Pr is calculated from the signal to interference ratio $SINR^{\ell}$; and

- the correlation coefficient ρ^{ℓ} is then calculated from the symbol error probability Pr.

6. (Currently Amended) ~~Method~~The method according to claim 5, ~~characterized in that~~ wherein it is assumed that $\rho^0 = 0$.

7. (Currently Amended) ~~Method~~The method according to claim 5 ~~or 6, characterized in that~~, wherein in order to calculate the symbol error probability Pr it is assumed that the total noise is Gaussian.

8. (Currently Amended) ~~Method~~The method according to claim 7, ~~characterized in that~~wherein the formula corresponding to the constellation originating from a linear modulation transmission is used.

9. (Currently Amended) ~~Method~~The method according to ~~any one of claims 5 to 8, characterized in that,~~claim 5, wherein in order to calculate the correlation coefficient ρ^{ℓ} from the symbol error probability Pr, it is assumed that when there is an error, the threshold detector detects one of the closest ~~neighbours~~neighbors to the symbol transmitted.

10. (Currently Amended) ~~Method~~The method according to ~~any one of the preceding claims, characterized in that,~~claim 1, wherein at the final iteration, the signal leaving the subtractor is introduced into a soft-input decoder.

11. (Currently Amended) ~~Method~~The method according to ~~any one of the preceding claims, characterized in that~~claim 1, wherein the information symbols are elements of a constellation originating from a quadrature amplitude modulation.

12. (Currently Amended) ~~Space-time~~A space-time decoder implementing a method according to ~~any one of the preceding claims,~~claim 1 for decoding a signal vector Y obtained from N sampled signals in a space-time communication system with M ~~transmit~~transmission antennae and N ~~receive~~receiving antennae, with N greater than or equal to

M, with a view to obtaining an estimation of the symbols of the signals transmitted, characterized in that it comprises:

- a pre-processing module of the vector Y for maximizing the signal to noise+interference ratio in order to obtain a signal $\tilde{r}^{\ell}$,

- a subtractor for subtracting a signal $\hat{z}^{\ell}$ from the signal $\tilde{r}^{\ell}$,

- a post-processing module for the reconstruction of the interference between symbols from the symbols estimated during the preceding iteration in order to generate the signal $\hat{z}^{\ell}$,

- a threshold detector for detecting the signal generated by the subtractor in order to obtain, for the iteration in progress, an estimation of the symbols of the signals transmitted;

and in that the N signals being processed by intervals of time T corresponding

to the time length of the linear space-time code associated with the transmission signals, the pre-processing module consists of a matrix B for maximizing the signal to noise+interference ratio, the transfer function of which is:

$$B^{\ell}=Diag\left(\frac{1}{\rho_{\ell-1}^{2} A_i^{\ell}+\frac{N_0}{E_S}}\right)_{1\le i\le MT} .C^{H}V^{\ell}$$

with $V^{\ell}=\left[\frac{1-\rho_{\ell-1}^{2}}{\frac{N_0}{E_S}}\cdot C\cdot C^{H}+Id_N\right]^{-1}$; $A^{\ell}=diag\left(C^{H}\cdot V^{\ell}\cdot C\right)$;

wherein ℓ: iteration index; ρ: standardized correlation coefficient between the real symbols and the estimated symbols; N_0: noise variance; Es: mean energy of a symbol; C: extended channel matrix.;

and in that the post-processing module consists of a matrix D for the reconstruction of the interference between symbols, the transfer function of which is:

$$D^{\ell}=B^{\ell}.C\cdot\rho_{\ell-1}-Diag\left(\frac{1}{\rho_{\ell-1}^{2} A_i^{\ell}+\frac{N_0}{E_S}}\right)_{1\le i\le MT}$$

13. (Currently Amended) ~~Decoder~~The decoder according to claim 12, ~~characterized in that~~wherein it comprises a soft input decoder receiving the signal originating from the subtractor during the final iteration.